The cilia described in these Decapoda conform in every respect to all authentic descriptions and pictures of cilia which have come under the writer's observation. In many cases, they are short and straight. In other instances they are long and wavy. In still other examples they cluster together to form the so-called brushes. Furthermore, the cilia in all the cases mentioned spring from a well-defined border, and also contain the characteristic basal granules.

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RHYTHMIC BANDING[1]

The formation of Liesegang's rings, known sometimes as "rhythmic banding," is of interest to the geologist and biologist as well as to the chemist. The color arrangement of agate is an excellent example of this phenomenon. Liesegang's original experiments dealt with the rhythmic precipitation of silver dichromate in gelatine. A solution of silver nitrate was poured on a solid gel containing dilute potassium dichromate. The precipitate of silver dichromate formed was not continuous but marked by gaps or empty spaces at regular intervals.

I found it possible to obtain distinct banding of silver dichromate in loosely packed flowers of sulphur. From this and other experiments it is evident that a gel is not absolutely necessary. In practise I found the best medium for sharply marked bands to be silicic acid gel. With this I secured remarkably crystalline banding of mercuric iodide, as many as forty bands in a test tube. Reduced gold in red, blue and green colloidal particles recurring in regular rainbow bands was obtained with a special silicic acid gel.

Basic gels made it possible to secure bands of cupric hydroxide merging into red and yellow forms of cuprous oxide. In a silicic acid gel of slightly basic reaction crystalline basic mercuric chloride formed in very distinct bands. The best banding in the absolute clearness of the gaps was that of copper chromate in a slightly basic gel.

Upon these experiments a new theory may be built. For illustration consider the copper chromate banding.

The gel contains a dilute solution of a chromate and above it in the tube a solution of a copper salt. The copper ions diffuse into the gel, meet the chromate ion and form a layer of insoluble copper chromate at the surface of the gel. The chromate ions immediately below this precipitation zone diffuse into this region now depleted of chromate ions and meet the advancing copper ions thus thickening the layer of copper chromate. According to Fick's law of diffusion the rate of diffusion is greatest where the difference in concentration of the chromate ions in two contiguous layers is greatest, that is, just below the front of this thickening band of copper chromate. As a result the region near the band decreases in concentration of the chromate ions faster than the space below. Finally the copper ions have to advance some distance beyond the band to find such a concentration of chromate ions that the solubility product of copper chromate may be exceeded and a new band formed. This repeats again and again. Of course if the copper ions were retarded sufficiently there would be time for the concentration of the chromate ions again to become uniform throughout the remaining clear gel and no gap would occur. Hence if the diffusion of the copper ions is retarded by any means the clear gaps decrease in depth—the bands are closer together. If copper ferrocyanide bands are formed in similar manner they almost merge after the first layer reaches a thickness of a few cubic centimeters. Yet they are distinct and agate-like. A precipitate of copper ferrocyanide greatly retards the diffusion of the ions that form it, hence we have here the proper condition to reduce the clear gaps to a minimum depth.

The complete paper with working directions and a full exposition of the theory will soon be published elsewhere.

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[1] Abstract of paper read at the Kansas City meeting of the American Chemical Society, April 12, 1917.